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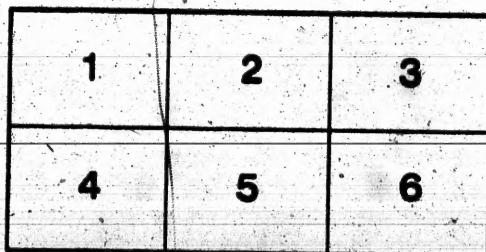
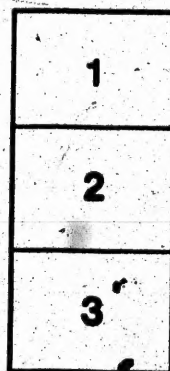
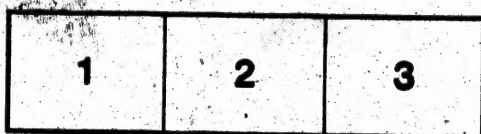
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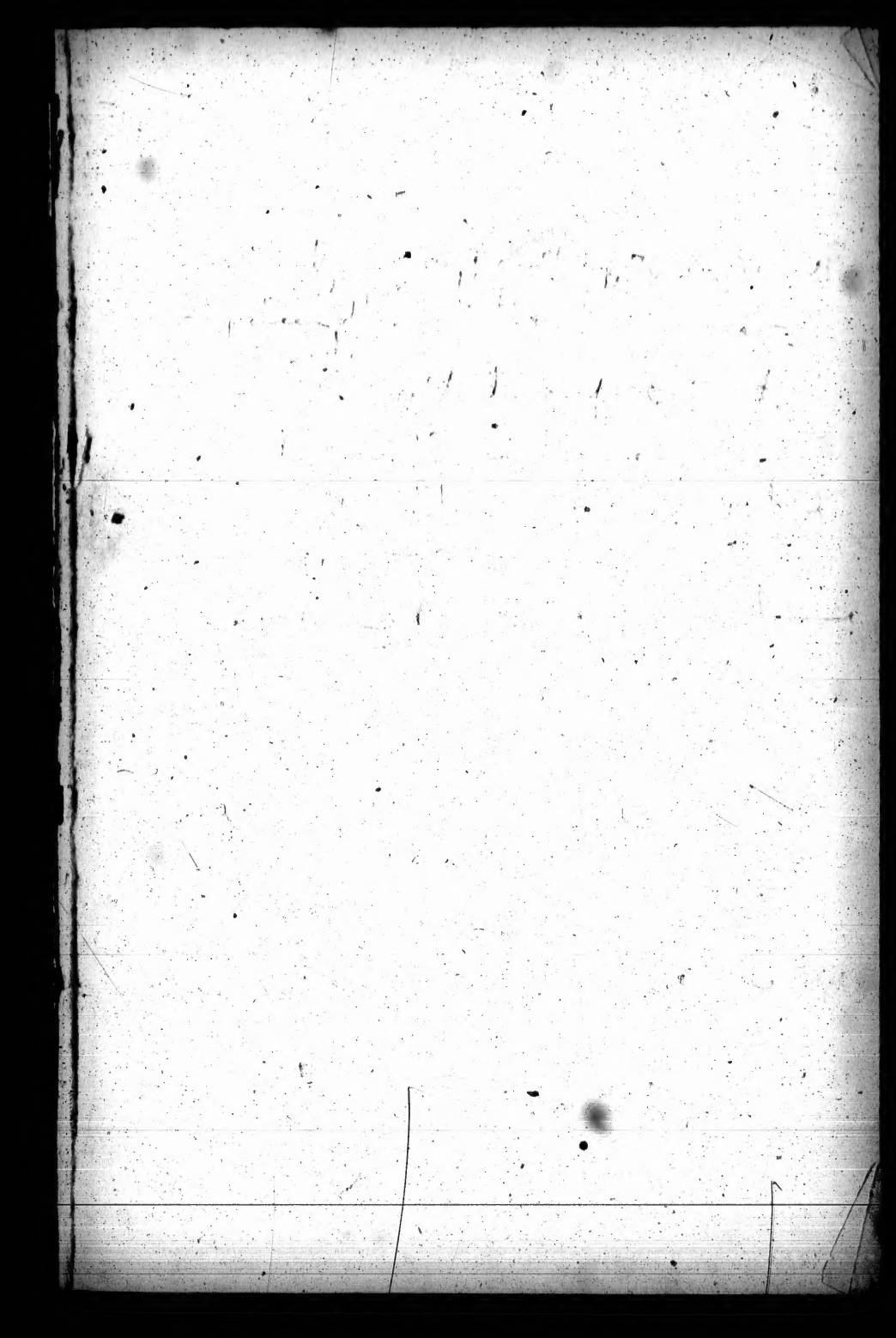
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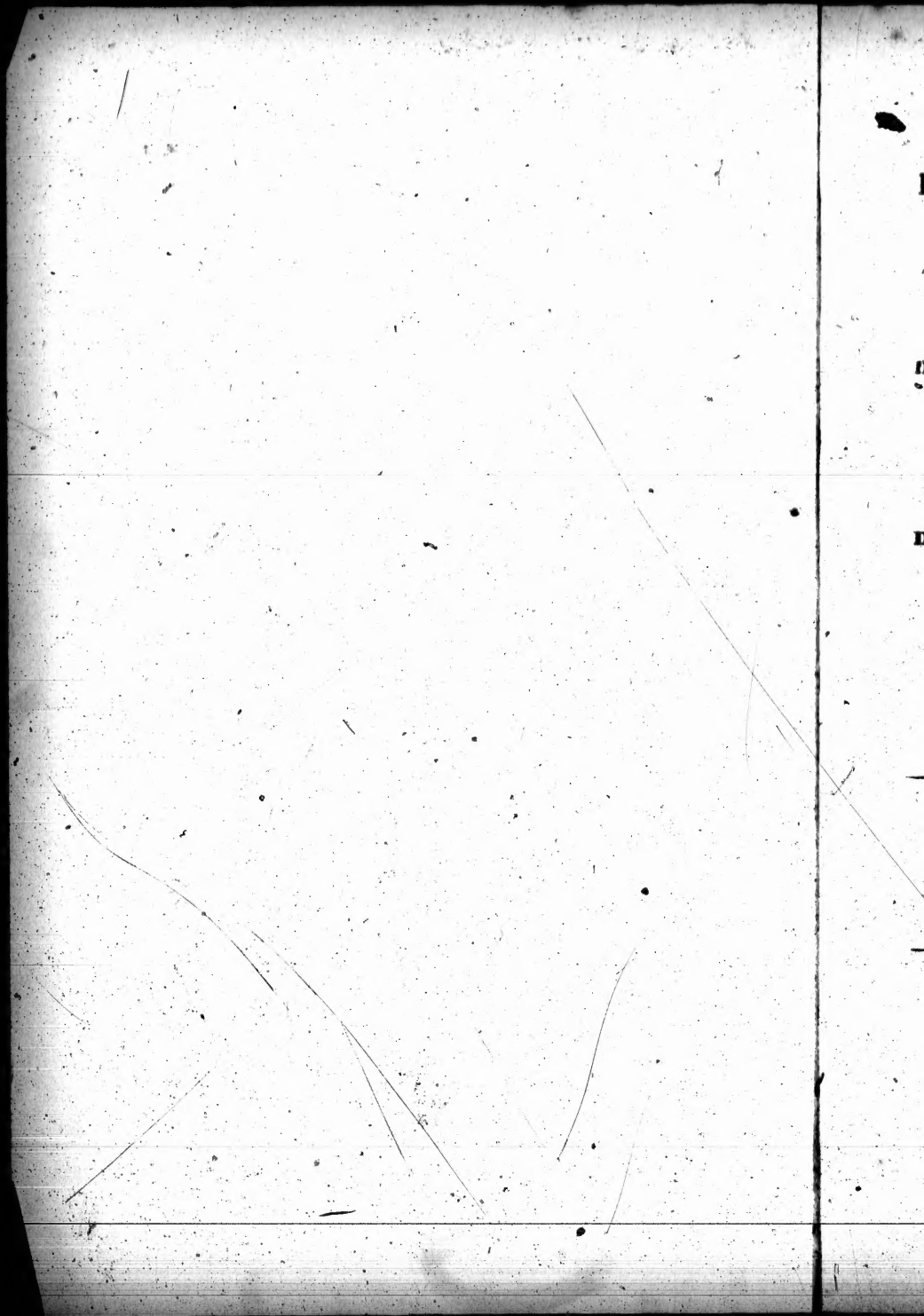
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*with the best respects of
the Author*

**MEDICAL
INAUGURAL DISSERTATION
ON
ASIATIC CHOLERA,**

**WHICH,
IN ACCORDANCE WITH THE STATUTES, RULES & ORDINANCES
OF THE**

UNIVERSITY OF M'GILL COLLEGE,

**FOR THE ATTAINMENT OF THE
DEGREE OF DOCTOR IN MEDICINE AND SURGERY,**

**WAS DEFENDED IN PRESENCE OF
THE MEDICAL FACULTY OF THE SAID UNIVERSITY,**

**BY
JOSEPH WORKMAN,
OF MONTREAL.**

" Ecce subit virus tacitum carpitque medullas
" Ignis edax, calidæque incendit viscera tabe,
" Ebibit humorem, circum vitalia fusum,
" Pestis, et in sicco linguam torrere palato
" Cœpit; defessos irret qui sudor in artus,
" Non fuit, atque oculos lacrymarum vena refugit."

LUCAN.

25th May, 1835.

MONTREAL:

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TO
JOHN STEPHENSON, M.D. S.C.L.
&c. &c. &c.
PROFESSOR OF ANATOMY AND MIDWIFERY,
IN THE
UNIVERSITY OF M'GILL COLLEGE.

RESPECTED SIR,

The following Essay is dedicated to you, as an humble acknowledgment of the deep obligations under which your kindness, through a long course of studies, has laid me. Whatever knowledge I may have attained of the profession to which I have aspired, I shall ever consider you as my guide, amidst the various intricacies with which the study of medicine abounds. Your promptitude in imparting, could be equalled only by your facility of communicating, and the condescension which you have always manifested in accommodating your instructions to the capacities of your pupils.

An intimate acquaintance with the virtues of your private life, has afforded me an opportunity of contemplating a character, which I shall ever consider it my highest ambition to imitate; and though the period has now come, when I am about to enter on the great theatre of life, I trust that, in acting my part, I shall never lose sight of the worthy example which you have afforded me, both in your public and private life.

Permit me, to assure you that I shall never look back on the years I have passed under your instructions but with the most sincere feelings of gratitude.

I am,

SIR,

With respect,

Your much obliged Pupil,

JOSEPH WORKMAN.

MEDICAL

INAUGURAL DISSERTATION

ON

ASIATIC CHOLERA.

INTRODUCTION.

THE subject of the following essay is one which has attracted the attention of the medical world, during the last seventeen years. It is a disease, with which, in this country, we have been woefully familiar. Whether we consider it in relation to the dreadful ravages it has committed, the terrific aspect which it wears, or the interesting phenomena which it displays, it cannot fail to excite in us the most intense feelings of awe and admiration.

In its desolating career it has spared neither age, nor sex, nor rank. Its path has been that of Death; and its ravages have exceeded those of famine and the sword.

In selecting it as the subject of my Inaugural Dissertation, I cannot be actuated by the hope of throwing light upon a disease that has embarrassed the most eminent, and the most sagacious members of the profession. The difficulties in which its consideration is involved, are not perhaps the least powerful inducements to the undertaking of the task; yet I cannot flatter myself with the hope of being able to offer any-

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thing that may be either interesting or instructive to those who have made the disease an object of extensive research, or close observation.

In the limits of an essay, it is not possible to enter into an extended consideration of the various divisions into which this subject resolves itself.

The arrangement which I shall adopt is the following:—

- 1st, A brief outline of the History of Asiatic Cholera.
- 2d, The Causes of the Disease.
- 3d, The Symptoms.
- 4th, The Diagnosis.
- 5th, The Prognosis.
- 6th, The Pathology.
- 7th, The Treatment.

HISTORY.

It is not the unanimous opinion of medical writers that the disease, now known under the various names of Asiatic Cholera, Spasmodic Cholera, Malignant Cholera, and Cholera Asphyxia, is a new disease—Hippocrates, Aritaeus, Sydenham and Huxham are said to have distinctly treated of this subject. It is said that in 1669 and 1676 it prevailed in London, and in 1730 and 1780, in Paris. In 1762 we are told it prevailed, to an alarming extent, in Hindostan; and in each successive season, an epidemic possessing the principal characters of Asiatic Cholera, prevailed, more or less epidemically in the Indian peninsulas. But we have no record of its extensive or epidemic prevalence before the year 1817. It is true, indeed, many have been inclined to believe that the tremendous pestilences, which the Indian historians have mentioned as having committed extensive devastations in this part of the world, at various periods, were no other than the disease in question; yet when we consider the vague and unscientific manner—in which both his-

torical and medical writers have been accustomed to describe diseases, and reflect upon the numerous and diverse diseases that have, from time to time, sprung up in this region of the world, which would almost seem to be the grand hot-bed in which nature has reared the greater number of the pestilences that have proved the scourges of the human race, we feel inclined to question the identity of the present disease with any of those mentioned by former writers.

Asiatic Cholera manifested itself in the year 1817 at Jessore, a large and populous town, about sixty miles N. E. of Calcutta, in that part of the Province of Bengal called the Sunderbunds, or Lowlands, which comprise the extensive district lying between the numerous mouths of the river Ganges.

It is stated to have appeared simultaneously at several other places in this part, and to have radiated into various surrounding districts. In July it had shewn itself at Patna, on the Ganges, 300 miles N. W. of Calcutta. In the middle of August it began to attract attention in Calcutta. In the autumn it raged amongst the troops of the Marquis of Hastings on the banks of the Sinde; and in the month of November, its devastations in the camp were so extensive, that in the short period of five days, 5000 human beings had fallen its victims. During the following month the disease had abated in every part of India; but in February 1818, it sprang up with renewed virulence, and assumed the dreadful character which it has ever since retained. Stretching towards the south, with deadly strides, it attained the most southern point of Hindostan, and passed over to the adjacent island of Ceylon, in the month of December. In November of the following year (1819) it was introduced into Mauritius; and in January 1820, it appeared in the isle of Bourbon. To the eastward we trace it advancing with untiring pace, and devastating the rich and populous countries, from the great Altaian mountains on the north, to New Holland on the south; appearing in Arracan in 1818, in Java in 1819, in Canton in 1820, in Pekin in 1821, and in the island of Timor in 1823. To the westward, we

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trace it to Bombay in 1818; to Muscat, near the mouth of the Persian gulf in 1821. Passing up the gulf, it visited, on its way, the towns on each side. It reached the city of Bagdad in 1821; and before the end of 1823 it had visited Antioch and Diarberk. During the winter it did not advance; and it seemed to have suspended its operations in this direction. From the north of Persia it passed to the borders of the Caspian sea; and in September 1823 it reached Astrachan, near the mouth of the Wolga, spreading terror into every part of Europe, that now seemed to have suspended, by a single hair, the awful sword of destruction over her head. But the rigours of a northern winter proved, at this time, uncongenial to its existence, for it gradually subsided, and relieved the trembling nations to the west, from the apprehension of immediate danger. From this time till 1829, we know little of its progress; but it never had ceased to exist in Persia, where it prevailed annually, with more or less violence. In the summer of 1829 it raged with increased fury in the eastern provinces of Persia, and passing down the river Jihon, and across the great steppes of the Kirghis Kassaks, it reached the province of Orenburgh, on the frontiers of Tartary in the month of August. It continued here until the following February, when it gradually subsided. In the summer of 1830 it passed out of Persia in another direction; and skirting the western coast of the Caspian sea, we find it once more in Astrachan on the 19th of July. From Astrachan it passed up the Wolga, and by the middle of September it had reached the city of Moscow. In April 1831 it had reached Warsaw, a city against whose devoted head the powers of heaven and earth appeared at this time to be combined; for the horrors of pestilence were now superadded to the devastations of a most bloody war. In May it entered Riga and Dantzic on the Baltic, and by the middle of June it was in Petersburg.

Towards the south we follow it into Berlin in August, and into Vienna in September. In October it shewed itself in Hamburg; and while all England was in a state

of trepidation, and wasting useful time in discussing measures, to prevent its entrance, the disease unexpectedly showed itself in Sunderland. From this place it spread in various directions, and before the close of the winter, it had shewn itself in all the principal towns of Great Britain. In the spring of 1832 it was prevalent in Dublin. In the beginning of April a vessel, named "the Carricks," sailed from Dublin, with 167 emigrants. Ten days after sailing one death took place, and during the succeeding fifteen days, thirty-nine more were added to this one. From this time up to the arrival of the vessel at Grosse Isle, the quarantine station below Quebec, only five deaths more occurred. The captain reported to the boarding officer "forty-four deaths, by some *unknown* disease." Whatever, at that time, may have been the general opinion, as to the real nature of this "unknown disease," no one now thinks of questioning its identity with Asiatic Cholera. We have had, since that time, but too many instances, perfectly similar to this, of the appearance of Cholera amongst emigrants on board of vessels bound to Quebec; and the awful havoc committed by it, in several of them, has been such as to excite the sympathy of the most heartless. The Carricks arrived at Grosse Isle on the 3d of June, and while the vessel was lying there, a female passenger died, after three hours illness. On the 7th of June a sailor died of Cholera in a boarding-house in Quebec; and on that evening the steamboat *Voyageur* left Quebec for Montreal; but, in consequence of being *overloaded* with emigrants, the captain was obliged to put back, and disembark a number of them. Several of the disembarked emigrants were, very soon after, seized with Cholera. The boat proceeded on her way to Montreal; but before arriving at Three Rivers, an emigrant named Kerr was taken ill, and died before the vessel came into the port of Montreal. Another emigrant named M'Kee had been seized on the afternoon of the same day (June 9th); he was carried from the boat into a tavern near the wharf.

The dead body of Kerr was exposed to the public gaze, during the next day, (Sunday 10th;) and was

visited by great numbers, from mere curiosity. Many persons also went into the tavern to see M'Kee—among others a soldier from the Barracks, in which place Cholera appeared that night, and this soldier was amongst its first victims. On the night of Sunday several cases occurred in various parts of the town. In several of them, communication with the other cases could be traced, but in others no direct connexion could be discovered. On the 11th several other cases occurred, and a continued increase of cases took place until the 19th, when the malady had attained its acme. From Montreal we can trace the disease along the grand travelling routes to the west and south. It appeared at Lachine on the 11th, amongst emigrants on their way to Upper Canada; on the 13th it had arrived at the Cascades—the first case was a person newly arrived from Montreal. On the same day, a boatman, direct from Montreal, died of Cholera at Cornwall. On the 16th it was at Prescott—the first cases were amongst persons just arrived from Montreal. On the 19th a boatman, from Montreal, died of Cholera at Brockville. On the 20th it was brought into Kingston. On the 21st the first decided cases occurred in York, (now Toronto.) On the 22d, a vessel from Kingston, called the “Massauga Chief,” loaded with emigrants, arrived in the river below Niagara; but on account of there being several cases of Cholera on board, the vessel was not allowed to come into port—Cholera did not at that time shew itself in Niagara.

Having thus followed the disease sufficiently far to the west, we may next trace it from Montreal towards the south. On account of the obstacles offered to emigrants on the American frontiers, the progress of the disease, in this direction, was neither so regular nor so rapid as we have seen it in passing up the St. Lawrence, in which direction it possessed every facility for its transmission—we find it in Laprairie on the 12th of June, and in St. Johns about the 14th. In several places upon the frontiers straggling cases occurred; but whether from the difficulty of telling truth, or that of ascertaining it, the accounts given by the various pa-

pers of its appearance along the grand southern thoroughfare, were of so confused and contradictory a nature, that it is absolutely impossible to follow it in this course with any degree of satisfaction. We find the disease reported in New York, July 4th; but some cases are said to have been observed previous to this date. The first case of Cholera in Philadelphia, is stated by some to have occurred on July 5th; but as a second case did not occur until the 14th, we have the strongest grounds for rejecting the reality of that on the 5th; for it would be an anomaly which, I believe, has never been observed in this disease, that a period of nine days should elapse after its arrival, without the appearance of a second case, especially in so populous a city as Philadelphia, and at a season of the year so favorable to its development as the first weeks of July. From New York and Philadelphia, the disease passed into the various surrounding States; and before the close of the year, it had traversed almost the whole face of the northern continent.

In Montreal it continued to rage with terrific violence, till the end of June. In the beginning of July it remitted in its violence; and many an earnest prayer was offered that it might be removed from amongst us. The whole city was one scene of mourning and of misery. In the short space of three weeks hundreds had been left without parents, without a morsel to eat, and without a shelter wherein to lay their heads—all the ties of nature were torn asunder—death was in every dwelling, and the wailing of the widow and the orphan was to be heard, no matter whither we should direct our steps. No wonder then that a gleam of hope should beam across our faces, when we flattered ourselves that the disease had spent its fury, and was passing away like the spent thundercloud from over our heads. But our fond hopes were soon to be blasted; for before the middle of July, the disease, like a giant refreshed from slumber, awaked with renewed vigour. Hitherto its victims had principally been from amongst the poor, and the upper ranks were flattering themselves on a happy exemption from its ravages; the di-

disease being termed by many of them "*plebeian* in its habits." But they were mistaken—death's carnival was not complete—and his devastations were now extended beyond the habitations of the indigent and the houseless.

The total number of deaths in Montreal, from the breaking out of this disease until its termination, was upwards of 3000; of these about 2000 were reported to be from Cholera; but there is no doubt that this proportion falls short of the real number; for many deaths were by Cholera, which, from various motives, of a very pardonable nature, were reported to be "not from Cholera." After the beginning of September, very few cases occurred—one or two appeared so late as the end of October. An attempt was made in the middle of winter, to persuade the Governor, that the disease had re-appeared; but the report received that degree of credit to which it was entitled. Many cases of Typhus, of a very bad type, were at that time met with; and it was generally believed that some of these were attempted to be conjured into Asiatic Cholera. From the fall of 1832 no cases of the disease were seen in the Canadas. During the months of June and July, 1834, some vessels that had had Cholera amongst the passengers during the passage, arrived at Grosse Isle. On the 11th of June a case occurred at this station. The official reports of the Health Officer did not mention this fact; but the tenor of them was of such a character as to leave little room to question the existence of something that required concealment. Why should the gentleman have found it necessary to use an expression of so qualified a nature as that there was not "at the time, a case of Cholera on the island," unless he was satisfied that one more explicit would have involved a danger of his veracity being afterwards questioned. The desire, on the part of public functionaries, to prevent the diffusion of unnecessary alarm, in cases of approaching calamity, is far from meriting censure; but it will generally be found that more serious apprehension is produced by a qualified denial, than by a candid exposure of the truth.

On the 6th of July several cases occurred in Quebec. On the 11th two emigrants, ill of Cholera, were carried from the steamboats, at Montreal, to the Cholera shed. On the 12th several cases occurred amongst the residents; and on each successive day there was a gradual increase. In about three weeks the disease was at the worst; the deaths being about seventy per diem. It then slowly decreased, and in October had disappeared. In the violence of its symptoms it cannot be said to have been inferior to that of 1832. The total number of deaths was about 1200. The inferiority of this number to that of the deaths in 1832, may be attributed to several obvious causes. The precautionary measures adopted by the inhabitants, in food, clothing, exercise, and last, but by no means least, in avoiding exposure to infection, tended materially to diminish the number of victims; besides, the disease in 1832 had made such havoc amongst the weakly and debilitated, that it found the general constitutions of the inhabitants more powerful to resist its impressions, than in 1832; so that, like a fire coming a second time, prematurely, across a forest, a sufficient quantity of brush-wood was not found to support its flame, with the same intensity as in its first visitation.

In its progress from Montreal this year, the disease deviated little from the laws which it observed in 1832; except that its close adherence to emigrants, proved, still more incontestably, the agency by which it is transmitted from country to country, and by which it has now nearly made the tour of the globe.

Having thus given as brief an outline of the origin and progress of Cholera, as is consistent with the nature of the subject, I shall next proceed to consider the causes of the disease.

THE CAUSES OF ASIATIC CHOLERA.

The division of the causes of Asiatic Cholera which appears the most natural is the following :—

1st. The Primary, or Specific Cause.

2d. The Predisposing Causes.

3d. The Exciting Causes.

It will be observed, that what is usually called the Proximate cause, is not included in the foregoing division. This term, as it is usually employed, is altogether unphilosophical; for as medical writers generally define the Proximate cause of a disease, it differs in no respect from the disease itself. We are told that the Proximate cause of a disease is that particular state of deranged action which exists in the organ or tissue diseased, and without which, the disease cannot exist. This is saying neither more nor less than that the disease could not exist without itself. It is therefore altogether illogical to employ a term which is calculated to convey a very erroneous idea of the ultimate nature of disease; for certainly, no one who has any idea of the relation subsisting between cause and effect, would ever dream that the cause of an effect was the effect itself.

Primary, or Specific Cause.

Few, at the present time, will be found to deny the existence of a Specific cause, in the propagation of Asiatic Cholera. There have, indeed, been some who have pretended, that, in this disease, they could observe nothing peculiar; and that Asiatic Cholera was nothing more than an aggravated form of the common Bilious Cholera "which is endemic in this country;" but it is very probable, that if much that has been written on this subject, could now be unwritten, we should find the aspiring authors as eager to get out of, as they were to get into, print—of the innate nature of the Specific cause of this disease, whether it be considered as an agent meteoric, atmospheric, telluric, or contagious,

we must, for the present, be content with a candid acknowledgement of our total ignorance. The agents which act as the essential causes of most of the diseases to which the animal economy is liable, are of a nature far too subtle to be detected by any means with which science has yet made us acquainted. Indeed, when we consider how far the most refined and complicated processes of inorganic chemistry, fall short of those which are performed in the animal economy, and which are properly termed vital chemical actions, or more commonly, vital actions, we will cease to be surprised that our knowledge of the nature of morbid agents is so imperfect as it is. With all our boasted powers of art, we cannot imitate any one of the simplest actions of an animal structure. Chymification, chyliification and fecation of the food ; oxygenation and depuration of the blood ; secretion of bile, urine, serum, mucus, or saliva, are processes, of the intimate nature of which, we are as totally ignorant, as we are of the mysterious union subsisting between mind and organization. If our ideas of the actions of our bodies, in the healthy condition, with which we are of course most familiar, be so very imperfect, they must be still more so, when we come to consider these actions in the diseased state. Were we able to detect the material principle, through the immediate agency of which, a muscle is rendered subservient to the dictates of the will ; or those, by which the proper nerves of the different senses are rendered susceptible of the various impressions made upon them by their respective stimulants, we might be warrantable in our expectations of detecting the subtle agents by which such diseases as Small Pox, Scarlet Fever, Plague and Cholera are produced.

The numerous reports that have been propagated, relative to the state of the atmosphere, in places where Cholera has prevailed ; the detection of animalculæ floating in myriads in it ; the extraordinary rapidity with which putrefaction has taken place ; the unusual mortality amongst horses, cows, dogs, and even ducks, have been all totally void of truth, or merely coincidental with the existence of the malady. It was stated in

the American papers, in 1833, that during the prevalence of the Cholera in Montreal, a piece of flesh meat, suspended from the top of one of our spires, was found completely putrefied in a very short time. Now this, in the first place, is nothing very strange in the months of June or July, as every unfortunate butcher can but too frequently bear witness; but, in the second place, we are not to suppose that, because a piece of *dead* animal matter putrefies, the bodies of living animals must bear it company, or that the processes of putrefaction and diseased action are either identical or similar; in the third place, we must not forget that the inhabitants of our good city do not reside at the tops of our steeples, and therefore, if putrefaction should be so much more rapid at this altitude than at that of the butchers' stalls, still we could not be much affected by an agent elevated so far above us; but, in the last place, it may not be impertinent to mention, that this experiment was never tried.

As to the existence of a more than usual mortality amongst the lower animals, neither in 1832 nor 1834 was this observed. During the prevalence of a malady such as Cholera, it is not surprising that every offensive object should attract our attention. If a dead cat be seen on the streets, or a dog be observed to vomit, or a duck to have the megrims, it is immediately noted as a most extraordinary phenomenon, and to be accounted for only by the "mysterious epidemic constitution of the atmosphere;" and certainly no condition of the atmosphere can be better entitled to the term *epidemic*, or general, than that observed where such occurrences take place; for cats and dogs, and men, too, die in all places and at all seasons.

It is a fact, now too well known, that Asiatic Cholera may exist perfectly independent of any peculiar known constitution of the air. It has prevailed amongst the stagnant pools of the Indian Sunderbunds, and on the arid sands of Arabia; in the frigid regions of Russia, and under the scorching rays of a tropical sun; in the pure air, and the genial climate of Ireland, and in the swamps of the southern states of America. The dis-

ease has certainly not manifested an equal degree of virulence in all these different places ; but this is a circumstance to be attributed to the influence of secondary causes, and not to any difference in the character of the primary Specific cause.

That the Specific cause of Cholera is not an epidemic principle, depending upon a peculiar constitution of the atmosphere, appears from the following considerations to be a legitimate conclusion. Diseases which ordinarily receive the name of epidemics, are observed to be of short duration. They either commence in one particular locality, and radiate into numerous others, shewing a predilection for those which are most similar to that in which they commenced, or they originate simultaneously in a number of places, without any intercommunication by travelling, commerce, or other modes of conveyance ; and after having prevailed with greater or less intensity for a period of time, generally limited, they are observed to cease entirely, sometimes suddenly, or to lose that identity of character, which diseases kept up by contagion, are found never to part with. Epidemics can be transmitted beyond the districts in which they are produced by means of persons travelling, who have contracted them in the diseased districts ; but in such instances, it invariably happens that no other cases follow those, in the residents of the place to which the epidemic has been carried. It is highly improbable that the same epidemic constitution of the atmosphere, which may have given origin to Cholera in the Province of Bengal, in 1817, or at any more remote period, should not only have continued to exist over since, but also travel gradually over the face of the whole habitable world, unchanged by every modifying agent, whose influence over diseases truly epidemic has been long well known ; as extremes of heat and cold, of dryness and humidity, altitude, soil, difference of habits of life in the inhabitants, with many others that need not here be mentioned. If the primary cause of Cholera be an epidemic constitution of the atmosphere, it is strange that it should traverse extensive tracts of land and sea, in opposition to the

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ASIATIC CHOLERA.

strong currents of wind, against which it had to contend in the Indian Peninsula, and the Indian Ocean; it is strange that it should have crossed the Atlantic Ocean, and threaded its way up the intricate navigation of the St. Lawrence, leaving unmolested the countries on both sides, and never manifesting its presence until it arrived in Quebec, and that too, at a time coincident with the landing of emigrants from on board a vessel on which it had raged during the passage. It is strange that a disease, really epidemic, should have never shewn itself in the lower Provinces of British America, lying south of the Gulf of St. Lawrence, and many hundred miles nearer to Europe, the previous seat of the disease, until the arrival of a steamboat from Québec, having cases of it on board; and stranger still that this disease, if really an epidemic, should be at that time prevented from entering these places, by the enforcement of a vigorous quarantine.

In few, I might say, without fear of refutation, in no instances has Cholera appeared in any place which has had no communication, direct or indirect, with places in which the disease prevailed—and it has been seldom that any place, having free intercourse with infected places, has escaped the disease. It is strange that Cholera should be considered as an epidemic disease, whilst, in its general aspect, it is altogether unlike diseases of this class, but perfectly similar to diseases acknowledged to be contagious. It is strange that its transmission from place to place should be attributed to agents which never have existed, or which, if they did exist, have been counteracted by opposing and adequate powers. It is strange that an agent adequate to the transmission of Cholera should be sought for elsewhere, when the most unquestionable proofs have been afforded of its being, at least in some instances, a disease communicable by contagion. It is not strange that the contagious nature of Cholera should be denied; for Plague, Small-Pox, Syphilis and Scarlatina have all, in their time, shared the same fate. It is impossible to read the history of these diseases without being struck with the close analogy subsisting be-

tween the Asiatic Cholera, in their transmission from place to place—they hung around the camp, and followed the march of armies; they were carried beyond the seas, and became engrafted in new soils; and to this day they have retained the very same characters which they showed at their commencement. From the time that Cholera became an itinerant to this day, it has in its movements selected the highways of men for its path. Whether we contemplate it in the east desolating the ranks of the victorious British, or in the west stalking amidst the hordes of the Russians; with the caravan traversing the great steppes on the borders of the Caspian Sea, or the frail bark on the bosom of the ocean, bearing from their fathers' home the squalid emigrants, seeking "other lands and other skies"—we see it uniform in its grand and general laws of movement, and we trace, in its general aspect, all the lineaments of the family, to which, in spite of predetermination, we are obliged to admit its consanguinity.

The inefficiency of quarantines and sanitary cordons, to arrest the progress of Cholera, has been adduced as a proof of its noncontagious nature; but before advancing this circumstance as an argument in support of any opinion, it would be necessary to show, that such establishments have been carried into full operation; it would be necessary to prove that quarantine regulations and sanitary cordons, when strictly enforced, have failed to effect the desired object. Now, the instances of the spreading of the disease being prevented, by the enforcement of a strict quarantine at Niagara and Miramichi, and the celebrated fact of the arresting of Cholera in the Isle of Bourbon, by a vigilant cordon, are facts which stand in direct opposition to the assertion above alluded to. Will any one pretend to say that our mockery of a quarantine at Grosse Isle is calculated to effect the exclusion of a contagious disease? Let a strict system of quarantine be carried into full operation, and then let us see if Cholera will continue to visit this country annually, as it will do, so long as things are managed as they have been heretofore. In no country in the world is there a fairer field for testing

its efficacy—we have only one route by which the disease can effect an entrance—the tide of emigration flows up the St. Lawrence, “et nulla vestigia retrorsa”—let a quarantine station be fixed 150 or 200 miles below Quebec, and not nearer—let every vessel entering the river be brought to, at this station, and every one that has had disease on board during the passage, be detained long enough to ascertain that it is not likely to reappear. Such vessels as have disease on board should be kept, until the state of health of all on board is such as to warrant their dismissal. Every vessel that may have, or may have had Cholera on board, should be kept at least a fortnight after her arrival, in the former case, and in the latter, a fortnight after the occurrence of the last case among her passengers. Lastly, every vessel should undergo a thorough cleaning. A second quarantine station should be fixed near Quebec—that at Grosse Isle would perhaps be the most eligible. At this station every vessel should be a second time examined, and should cases of cholera have occurred since the last examination, she should be sent back to the first station, to be there dealt with as other vessels arriving with Cholera on board. It is true, such a system of quarantine would be attended with considerable expense; but this would be a matter of trifling consideration, when compared with the loss which this country must sustain by the annual ravages of Cholera; and should we, by a fair trial of such a system, succeed in keeping out the disease, our neighbours of the United States, ever celebrated for their liberality and public spirit, could not refuse to contribute largely to defray the expenses of an establishment, from which they would derive no less advantage than ourselves—for they may rest assured, every season that we have Cholera, we will send them a sample of it. The trial of such a system as that, of which an outline has here been given, would surely be worth making; and should it fail, we would have the consolation of having done what we could to avert one of the greatest calamities that can afflict us.

The contagious nature of Cholera has again been

denied, on the *assumed* ground that the proportion of persons affected by it, out of a given number exposed, is too small to warrant our admitting its communication by this means. But we do not observe that all contagious diseases are equally energetic, relative to the number of persons that will be affected by them, upon coming within their spheres of action. A predisposition, of a certain degree, is required for them all, in order to ensure their production. Some of them appear to require this predisposition in a very trifling degree, while others will not act unless it be present to a considerable extent; and there are some persons who will resist particular diseases, even of the most intense virulence. Thus some have never taken Small-pox, though repeatedly exposed to it, others have never had Measles; and in the eldest and most eminent practitioners of this city, we have a remarkable instance of resistance to the action of the contagion of Scarlatina; even Plague itself has failed in affecting some who have been exposed to it. We should, however, judge very erroneously of the proportion of persons affected by Cholera, were we to look upon the mere number of reputed, or fully developed cases of the disease, as the criterion by which we are to form our opinion—out of the whole population of this city, both in 1832 and 1834, it is no exaggeration to say, that seven-eighths laboured under the influence of the primary cause of Cholera, at one time or other, from the commencement till the termination of the malady. The same observation has been made, in every place where Cholera has appeared, not by the advocates of contagion, any more than by its opponents. How then can it be said that the sphere of action of the primary cause of Cholera is more limited in extent, than that of many other diseases of an unquestionably contagious nature?

The relation subsisting between the primary cause, and the predisposing and exciting causes of Cholera, and the dependence of the former upon the latter, for the full developement of its action, have not received that degree of attention which they demand from those who would form just conclusions upon this part of the

subject. During the prevalence of the disease, comparatively few escape its influence—when there chances to be in the persons affected a strong degree of predisposition, we shall probably observe the speedy development of the disease, without the aid of any other agencies; but, in nineteen cases out of twenty, the disease will not be fully developed, before the application of some of the well-known ~~existing~~, or secondary causes. It is from this circumstance that we find the clergy, physicians, medical students, and hospital attendants, so generally escape. From the precautionary measures, which their exposure prompts them to observe, they seldom afford the disease an opportunity of fully forming itself. They are not, however, exempted from the influence of the primary cause; for amongst them, during some part of the period of the disease, we shall find that the proportion who labour under derangement of the digestive organs, and the other premonitory symptoms of the disease, is much greater than amongst the general population. Let them only apply the igniting spark to the train, and we shall have to observe more frequent explosions than we might have anticipated.

A medical gentleman of this city, in a short publication on Cholera in 1832, stated that the clergy enjoyed a complete immunity from the disease; but a more extensive knowledge of facts would have prevented his falling into so palpable an error; for the medical attendant upon the gentlemen of the seminary, had no less than four of them under his treatment in one day, all labouring under violent premonitory symptoms; and he informed me, that nothing but the most energetic measures, and close attention on his part, conjoined with the most strict adherence to his injunctions, on theirs, prevented the full development of the disease; so much for random statements.

Upon the whole then, it would appear that Cholera, though much less extensive in its sphere of action, and much less violent in the immediate effects resulting from the action of its primary cause than some other contagious diseases, affords, upon a mature considera-

tion of all the facts connected with it, sufficient evidence of its being a disease, communicated and kept up by contagion.

Predisposing Causes.

The causes predisposing the system to Cholera, are all those which have a tendency to disturb that equilibrium of the functions, in which consists that condition of the body, properly called good health; excessive fatigue, from long continued exertion, or want of sleep; the depressing passions, as grief from the loss of friends, fright, extreme apprehension of danger from the disease; a debilitated condition of the system, resulting from previous disease (particularly of the digestive organs), or from habits of intemperance; that peculiarity of constitution usually termed nervous mobility; all powerfully predispose to this disease. There is reason to believe that in some families, a very great tendency to Cholera exists; for in 1834 it was observed that many families which had suffered in 1832, were again visited by the disease; whilst others, who escaped in 1832, were also exempt in 1834. The male sex appeared to be more liable to Cholera than the female; but this difference must result from the more strict adherence to temperate habits of life in the latter. I remarked, that amongst females attacked, a great number were in the catamenial period. The general constitutional disturbance which, in many females, accompanies this important process, cannot fail to render them, during that time, more obnoxious to the influence of morbid agents. No age can be said to be exempt from Cholera; but the advanced stages of life are those on which it falls with most violence; very few recover from the disease, who have passed the sixtieth year; and from forty-five to sixty, is the period of life, which furnishes the greatest *proportional* number of cases. It has not been observed that those who have had Cholera once, are exempt from a second attack.

Exciting Causes.

The most prominent agents amongst this class of causes, are undoubtedly such as have a tendency to disturb, either directly or indirectly, the functions of the digestive apparatus—all articles of food, or drink, that tend to produce indigestion, either from their quality or quantity, must be avoided during the prevalence of Cholera. But it is impossible to specify the various substances which should be proscribed—nothing that is digested with difficulty during a season of health, can be indulged in during Cholera, without great hazard; and whatever is readily digested by the stomach, in health, may be indulged in, to a moderate extent, with perfect safety. Substances which agree perfectly well with the digestive organs in one individual, may prove very detrimental to those of others. Many cases of Cholera, of a very violent form, have been observed to follow an ill-advised administration of emetic, or purgative medicines. The disturbance of the alimentary canal produced by these agents, is all that, in such cases, is required to give the most complete developement to the lurking disease; therefore, during the prevalence of Cholera, every derangement of the alimentary canal should be treated with the utmost circumspection. By the exhibition of strong medicines we may fire a mine, the existence of which we may not suspect.

A very hurtful impression was generally prevalent, that water was a dangerous fluid to drink during Cholera. Cold water, in *excessive quantities*, is indeed dangerous; and what drink is not, if we transgress the limits of moderation? But of all the beverages which we can indulge in, there is none so safe, when used with caution, as pure water. The temperature of the water which we drink should be about that of our river-water at the season. A few mouthfulls, taken slowly, will, at any time, be more powerful in allaying our thirst, than a large quantity, gulped down with voracity. If the observance of the laws of temperance be more incumbent upon us at one time than at any other, it is

during the existence of Cholera. But we are not to suppose that mere abstinence from stimulating liquors, constitutes temperance; our moderation must be extended to every thing that can influence the functions of the body; whether it be in food, drink, exercise, sleep, clothing, or the indulgence of any of our appetites.

SYMPTOMS.

The phenomena manifested by Cholera in various cases, or in the different stages of the same case, render it necessary, in order to consider them with advantage, to divide the disease into different periods. The division which appears to me the most accurate, is that which has been adopted by Professor Jackson of Philadelphia, in the 22d Number of "The American Journal of the Medical Sciences." The arrangement which that gentleman has made, is the following:—

First period—incipient irritation, or the promonitory stage.

Second period—confirmed irritation, or forming stage.

Third period—incipient concentration—collapse commencing.

Fourth period—confirmed concentration—complete collapse.

Fifth period—reaction—febrile state.

The number of cases which the disease presents, in different periods, differs widely in private practice, from the number observed in hospitals. In the former, not less than five cases are met with in the second, for one in the third stage; whilst in the latter, four cases are met in the third, or in the close of the second, for one in the early part of the second period. The number of cases which come under medical treatment in the early parts of the first period, in private practice, exceeds the sum of all the others; yet it falls far short of the actual number of persons that labour under the premonitory

symptoms; for many never have recourse to any medical advice, but by a well regulated regimen, are restored to their usual condition of health. In private practice, the disease is comparatively seldom seen in the fifth stage; whilst in hospitals, as a great majority of the cases must inevitably run into collapse, because of the advanced period of the disease in which the patients are generally brought in, it must either terminate by death, in the collapsed state, or pass into the stage of febrile reaction.

A knowledge of the symptoms of the first, or premonitory stage of Cholera, is of the utmost importance, not only to the practitioner of medicine, but also to the community at large; for no disease can be more insidious in its approaches, nor is there, perhaps, in the whole range of medical nosology, a disease, which, if duly attended to in the premonitory stage, is so much under the control of medicine. But if this period be suffered to pass, unattended to, the patient may have perhaps squandered away "golden minutes," which he may deplore, but cannot recal. In Cholera it has been but too truly said, "that prevention is every thing, and cure too often impracticable."

The premonitory symptoms may generally be considered as the direct result of the action of the specific cause. The digestive apparatus seems to be their seat; they usually first obtrude themselves upon the notice of the patient after taking some article of diet which he finds to disagree with his stomach; this disagreement is the consequence of the abnormal condition of the alimentary mucous membrane, in relation with the ingesta, which is produced either directly or indirectly, by the impression of the primary morbid agent. In this condition of the digestive organs, the ordinary articles of food act upon them as foreign bodies, and necessarily give rise to feelings of uneasiness, referred to the epigastric centre. If the person so affected pays attention to these kindly admonitions of instinct, and allows nature the state of quiescence which is indispensable to the full exertion of her salutary powers, the lapse of a very short time will, in general, suffice to enable her to

gain the ascendancy over her deadly antagonist. But should her voice not be hearkened to, should the timely notice she has given, of the mortal struggle that has commenced within her realm, be unheeded, or her potent arm be shackled by the indiscretion of the patient, she soon *will* make herself be heard, but it will be with the voice of the growling volcano, which is about to burst forth in irresistible fury, and pour out from its writhing entrails the headlong torrent, to blast, in its desolating path, the fair face of nature's loveliest works.

If the premonitory symptoms, either from the aggravating influence of exciting causes, or the predominant power of the primary morbid agent, should be found to assume a formidable shape, they will vary considerably in different constitutions and temperaments—they will differ according to the difference of exciting causes. In the sanguine and plethoric, the most prominent arrangements will manifest themselves in the vascular system. The action of the heart will be accelerated, and the pulse unusually full; thirst, nausea, and after some time, vomiting will be present: coexistent with which, or soon succeeding, there will be purging, at first in a moderate degree, but gradually becoming more severe, as the case approaches to the second period; and should the patient be of a bilious temperament, the stools will be surcharged with bile. In such cases there will be a rumbling, uneasy sensation of the bowels, rather than actual pain; and each dejection will be succeeded by a smarting sensation of heat at the anus, and in the lower extremity of the rectum. In the nervous temperament, the phenomena are of a different character. The action of the heart and arteries is little, if at all excited; often it is diminished; the thirst is not so very urgent; but the energies of the nervous system are evidently exalted; spasmodic twitchings in the muscles, particularly in the calves of the legs; colicky pains in the bowels, and a general agitation of the mind, as well as of the body, will be observed. In the great majority of cases, the premonitory symptoms are unaccompanied by any painful sensations; and in this circumstance consists the dangerous and deadly character of Cholera.

The patient, indeed, observes that his calls to stool are unusually frequent, and the discharges very free and copious; but *pain*, that faithful sentinel of nature, here sounds no alarm; the insidious enemy advances, and is sapping away the foundations of the fortress, while his devoted victim is reposing in undisturbed tranquility. Nothing is more common amongst the lower classes of society, during the prevalence of Cholera, than to meet with cases advanced to the third or fourth stage, after the existence of a copious diarrhoea, for perhaps a whole week. When questioned as to the existence of previous indisposition, the patients almost invariably declare that they have been perfectly well till within the last few hours. But we never should believe them; for if we follow up our inquiries, we will find they have had "a lax" for several days, but they have had *no pain*; and there could be no harm, they tell us, in a looseness of the bowels, unattended by pain, since they have always considered the violence of a disease, to be in the direct ratio of the pain attending it. Again, in persons of intemperate habits, the presence of abdominal uneasiness, and even of a considerable degree of pain, with derangement of the bowels, excites no alarm; for they are accustomed to these occurrences; their habits almost invariably lead to these consequences.

The disease being thus allowed to progress, we find, after the lapse of a longer or shorter time, the *second stage* ushered in. Perhaps the majority of cases, usually recognised as decided Cholera, in private practice, are met with at this period. It is only now that the patient begins to be alive to a sense of his real danger, the diarrhoea becomes troublesome, and begins to exhaust the powers of the system; vomiting, if it have not before been present, soon appears; at first the matter thrown up is that which chances to be in the stomach, but afterwards it is often a thin greenish fluid, and ultimately, it frequently is as clear as spring water, the thirst becomes insufferable; every feeling of the patient seems to be absorbed in the one insatiable desire for cold fluid; his unceasing entreaties, and sometimes imperative demands for "cold water," are al-

most irresistible. This stage of Cholera is, most frequently, suddenly developed, by the action of some of the exciting causes, as a copious draught of cold water, or of any other fluid; some quack medicine taken by the advice of intermeddling gossips; a forced meal, either of ordinary food or of some dainty preparations, taken to flatter the rebellious stomach; or a hearty glass of the grand panacea, grog; to these might be added many others, too well known to require enumeration. It is not long before that most distressing of all the symptoms, *cramp*, presents itself; and it is now that consternation seizes the bystanders. It usually commences in the toes and fingers, and advances towards the trunk, the patient's cries are often paralyzing; yet, in some cases, the most excruciating suffering can hardly extort even a groan; so unyielding is the mental firmness evinced by those who are too proud to be thought of an unmanly frame. These cases of severe cramps, though alarming to the attendants, are far from being invariably the most unfavourable; for recovery has taken place where the degree of agony suffered, might, of itself, have been thought adequate to the extinction of life, and in some of the very worst cases that are met with, cramp has never appeared, or has terminated very speedily.

As this stage advances, all the symptoms assume a more deadly aspect, but above all the changes that take place, there is none which should so much excite our apprehension as the appearance of the "*rice-water-stools*"—now it is that the vital powers are beginning to give way. The vital molecular affinities, by which the various animal compounds are held in combination, are beginning to be overpowered; the constituent elements of the blood, that fluid which is essential to the existence of life, cease to be held together by that vital attraction which heretofore existed between them; the serous portion, which, in the whole system, exceeds four-fifths of the whole mass, escapes by every pore, not only of the alimentary canal, but also of the skin. This state of things if not mitigated, cannot long continue without the appearance of other more lethal

symptoms ; *the third period*, or that of incipient collapse is ushered in ; the whole appearance of the patient now undergoes a change which indicates the tottering condition of the powers of life.

"*Ecce subit facies lethô diversa suavit.*"

Death, which had, till now, in concealment, been destroying the internal parts, shows his grim visage on the surface. The paleness of the tomb is diffused over the face ; the coral lips have lost their hue ; the eye, that but a few hours gone, seemed only "formed to threaten and command," has lost its lustre ; the tears refuse to flow, even at the excitement of the most distressing severing of all the ties of sympathy and affection ; the voice becomes hollow, sunken, and almost inaudible, coming as it were from the bottom of the throat, and resembling a loud whisper ; the tongue feels cold, and when the finger is placed upon it, it gives a sensation like that produced by touching a frog ; a deluging sweat covers the whole surface, and in the depressions about the clavicles it forms into small ponds ; the skin feels as if coated over with maple juice, and the hand adheres to it, when rubbed along it ; the respiration becomes frequent, and labored, and the breath is cold ; the patient sighs frequently ; in some cases, the countenance at this time, is truly horrifying ; there is a wildness, intermingled with despair and agony, which gives the patient an aspect that makes us at once shrink and shudder ; in fact the "*facies cholericæ*" cannot be described in one half its horrors. The first time that any person sees it, he professes that he never before saw any thing to be compared with it ; and he never could have formed an adequate idea of it, from the most vivid description.

The symptoms of the fourth stage are principally those observed in the third, but in a more marked and aggravated form. External congestion shews itself ; the nails, the fingers and toes become blue ; this lividity advances towards the trunk ; the fingers shrivel, and are perfectly similar to those of a washerwoman. The patient feels a sensation of a heavy weight in the

lower and posterior part of the thorax, as if some large solid mass were squeezing his inside : so distressing is this symptom, that I have heard some implore to have their "inside laid open," and the substance removed. Another very distressing symptom often complained of, is a violent pain in the side ; this has been supposed to result from spasm of the diaphragm, but it may be merely a modification of the other symptoms last spoken of, which seems to be the consequence of pulmonary congestion, giving rise to an impossibility of dilating the lungs, and causing a sensation of suffocation, which is reflected upon the respiratory muscles. It is not likely that cramp of the diaphragm could occur, without causing instant death ; for the motion of the thorax must be completely suspended, so long as this violent contraction of the diaphragm continues ; but this suspension is not observed. The pulse in the extremities, which had for some time been flagging, now becomes almost imperceptible, and very soon ceases to be felt. If the lip be turned down, the blood, in the vessels of the lining membrane, is seen to be completely stagnated, and if it be forced out of them they do not fill again ; the same will be observed with the vessels on the surface of the extremities. The eyes are sunk in their sockets ; the bones of the face project, and seem to have no covering but the cold livid skin. The temperature of the body is at least fifteen degrees below the ordinary standard. The mouth stands agape ; the alae of the nostrils are dilated ; the superior muscles of respiration are seen to labour much, and the patient looks like a man hanging. For some time preceding death all the phenomena of animal life seem to have completely ceased ; the patient lies on the back, in a state of perfect insensibility, with the eyes fixedly turned upwards, and the upper eye-lid half closed ; he is in a comatose condition. Death, that till now seemed to have prolonged the existence of his victim, merely to enjoy the spectacle of his tortures, in sullen triumph bears away his spoil.

Such is a faint outline of the ordinary symptoms of this fearful disease ; but it is not to be expected, that in the small space allotted to this subject in an inaugural

essay, a full description can be given of the varied phenomena of a disease whose depiction mocks the powers of human language. Many symptoms, not mentioned here, are to be met with in an extensive practice; enough however, has been given, to convey a general idea of its nature.

DIAGNOSIS.

In the fully formed state of Cholera, difficulty of Diagnosis can hardly arise; the disease is but too easily recognised; yet cases of disease of the alimentary canal are met with, which so closely simulate nearly all the features of Cholera, that they are sometimes mistaken for it. The similarity between the symptoms attendant upon a case of poisoning by arsenic, and this disease, is sometimes so close that it is not possible, from a mere examination of them alone, to distinguish the one affliction from the other. Cases are on record where persons who had swallowed a large quantity of this substance, have been carried to the Cholera hospital, and received as patients labouring under fully-formed Cholera; nor has the nature of the affection been ascertained, before the accidental discovery of the fact that poison had been taken. In many places too, where Cholera has appeared, we are informed, so much has this disease appeared to resemble the action of poison, that unfortunate religious sects have been almost exterminated, from suspicion having fallen upon them of attempts to destroy their fellow-citizens by poisoning the wells. Last summer, during the prevalence of Cholera, I saw a case of poisoning, by excess in eating, after long continued hunger; and the symptoms were so very similar to those of Cholera, that, without having discovered the fact otherwise, I could not possibly have ascertained, by the appearance of the patient, the real nature of the case. I saw a pa-

tient of Dr. Stephenson's about the same time, for whom that gentleman was sent, with all despatch, as she was, in the opinion of the family, very ill with Cholera; and certainly so far as cramps were concerned, there could not have been a more strongly marked case—almost every muscle of the upper and lower extremities was thrown into the most violent contractions, and knots were felt in them like knobs on the branches of an oak; the muscles of the back and of the neck were so violently affected, that the patient actually rested at times on the heels and occiput, in the form of a bow. This case was no other than a violent fit of hysteria, brought on during the catamenial discharge. There is little doubt that many such cases have been recorded as genuine Asiatic Cholera; and many infallible remedies have been proclaimed to the world by ignorant practitioners, or designing empirics, who perhaps have never in their lives seen a real case of Cholera. There is good reason to believe too, that most, or rather all of the cases that have been recorded as instances of Asiatic Cholera, appearing sporadically, before the introduction of the disease from other places, have been no other than cases of intense muco-intestinal irritation, resulting from very violent excitation of the digestive mucous surface. Indeed, the important part which this tissue plays in the animal economy, the infinitely varied sympathetic derangements to which irritation of this tissue gives birth, have never yet received from the great body of the medical faculty, that attention which ought to be bestowed upon them, before it is possible for us to obtain correct ideas of the phenomema of the greater number of the diseases incident to the human body.

PROGNOSIS.

Our prognosis will generally be determined by the stage to which the disease has advanced when we are

called in. In the first stage, it may be said to be, with few exceptions, favourable—cases, indeed, will be met with, in which, from the advanced age of the patient, strong predisposition, the violence of exciting causes, the intensity of the impression of the primary cause, the incontrollable terror of the patient, or his utter recklessness, all the efforts of the practitioner must prove unavailing. So long as watery stools have not yet appeared, we have good grounds to hope for a favourable issue; but when this symptom has shewn itself, we cannot be too guarded in the opinion we venture to give—still, while there is a ray of hope, we should take care not to extinguish it, for once the practitioner has “given up” the case, he cannot rely a moment on the co-operation of the relatives and attendants, in seconding his efforts; so soon as his back is turned, each of them will be for administering some infallible cure, of the efficacy of which he will quote a hundred indisputable proofs. From an unguarded frankness on the part of the medical attendants, the worst consequences have sometimes resulted. I have seen cases that might have ended favourably, put beyond all hopes of recovery, in one hour, by the interference of intermeddling boobies, who should have been rewarded for their labour by half a day in the stocks or the pillory.

If the violence of the urgent symptoms, as vomiting, purging and cramp, is found to abate, and a general warmth to be diffused over the surface, the pulse becoming fuller and freer, the countenance more lively, the secretion of urine recommencing, and a change in the intestinal secretions take place, indicating the presence of bile and healthy fecal matter, or even colored mucus, a free warm perspiration on the skin, with an abatement of the thirst and gastric irritability, we have good reason to expect a favourable termination.

The symptoms which lead us to an unfavourable prognosis, are most of them of a very unequivocal character—an obstinate continuance of watery or colourless stools, and the vomiting of a fluid similar to that discharged by stool; a profuse, cold, clammy sweat; shrivelling of the fingers, and blueness of the

extremities ; flagging of the pulse ; frequent deep sighing, with an appearance of distress and anxiety in the countenance ; suppression of urine ; severe pain in the side ; early cessation of vomiting, unaccompanied by an improvement in the other symptoms ; the voice becoming almost extinct ; the breath perceptibly cold, and the respiration laborious ; great restlessness, and tossing about in the bed ; are all indicative of a fatal issue. To these might be added a great many others, but more would be quite unnecessary.

A temporary amelioration of the symptoms is frequently observed, even in the worst cases ; but it is only a delusive improvement, for nature seems unable to rally sufficient force to keep it up, and we sometimes observe the patient unexpectedly to expire in a very short time, after fond hopes of his recovery had sprung up in the hearts of his friends. Even after having succeeded in allaying the violent symptoms, we may be unable to lead the patient back to health ; the powers of nature may have been already too far exhausted, to be adequate to his restoration ; and though we may have conducted the shattered vessel off the quicksands of death, she may sink at the very entrance of the port.

PATHOLOGY.

The researches of the pathological anatomist, which have thrown so much light on the doctrines of disease in general, have hitherto effected but little that can tend to give us correct ideas of the morbid condition of the organs during the first stages of Cholera, or that can lead us to form indications of treatment suited to the diseased action existing. Most of the morbid appearances presented to us on post mortem inspection, are the result of changes that have taken place a short time previous to the cessation of life, after the termination of those important actions which constitute the

essential phenomena of the disease, so far at least as the treatment is concerned. It is not to be expected that the usual morbid alterations of structure, (which we are accustomed to find after diseases of an ordinary nature,) as softening, hardening, thickening, enlargement, diminution, ulceration, gangrene, &c. will be met with in a very extensive degree, after so short a period as that usually required for the extinction of life, by a disease of such intensity as Cholera. These are changes depending upon an abnormal state of the process of nutrition, and therefore are not the production of a day. Time is required for their completion; and, above all, a certain degree of energy in the nutritive action of the part is required. Are we then to look for effects, to produce which there are no causes existing? The ecchymosed appearance of the mucous surface of the intestines, usually observed in Cholera subjects, has by many been mistaken for gangrene, but it differs widely from this condition. This ecchymosed state may be considered analogous to that state of the cutaneous surface which is also met with in Cholera. Both of them result from the vitiated condition of the blood, and the morbid condition of the extreme vessels in these parts, the vitality of which being completely destroyed, their contents must become stagnated, and the structure of these parts being the most lax in the whole system, we find, as a consequence, the dark, viscid blood deposited here in considerable layers. In the inferior portion of the small intestines, and the coecal extremity of the colon, these dark patches are always seen in greatest abundance. In phthisis pulmonalis, accompanied by ulceration of the intestines, we find this portion of them most extensively ulcerated; there is reason, therefore, to believe that the vitality of this part of the alimentary canal, is weaker, and its structure less firm, than those of any of the rest of that organ. From these circumstances we may readily conceive that this is the place in which ecchymosis should be most extensively met with. The degree of vital energy of this part of the intestines, we infer, *a priori*, is not required to be so exalted, as in the portion in

which the process of alimentation, more appropriately, is effected.

On almost the entire alimentary surface there is found, after Cholera, a coating of a whitish tenacious fluid, resembling the matter of the ricewater stools; its presence gives us no information relative to the true nature of the disease. We know that a morbid action has been required for its production, but what that action was, the fluid alone cannot shew to us. All the abdominal vessels; but particularly the extreme ramifications of the mesenteric arteries and veins, are found congested; and the colour of the intestines, upon their peritoneal side, is of a dark or rusty red, resembling decaying leaves in October. The large arterial trunks are found contracted, and contain very little blood, whilst the corresponding veins are proportionably distended, and overloaded with dark, grumous, uncoagulated blood. The bladder is generally found without a drop of urine, and contracted almost to obliteration. The large intestines, particularly the descending colon and the sigmoid flexure, are found contracted, sometimes to one-fourth their usual size. Many other morbid appearances might be mentioned, but their enumeration would be more a matter of curiosity than of utility. The post mortem phenomena of Cholera, then, merely prove to us that there has existed an extraordinary disturbance in the vascular apparatus of the alimentary organs; but it is impossible for us to separate the morbid appearances that have been caused by the essential deranged actions, constituting the real disease, from those which are merely secondary, and have been necessarily produced by the more important ones that have preceded. We must therefore have recourse to other data, upon which to found our indications, relative to the true nature of this disease; and these data are the symptoms. If we examine closely the phenomena presented to us by a case of incipient Cholera, we find that the first cognizable deviations from the healthy equilibrium manifest themselves in the functions of the alimentary canal. The extraordinary prevalence of gastro-intestinal derangement during the presence of

this disease in any vicinity, leads us to conclude that the specific cause, whatever may be its nature, or on whatever part of the system it may make its first impression, has a direct relation with the mucous surface of this organ. The appearance of the tongue and fauces, the epigastric sensations, the mental depression, and the fastidious condition of the appetite, all indicate a morbid degree of action existing in the gastro-intestinal apparatus. From a comparative view of these symptoms with those which accompany other affections of these organs, we are induced to believe that there exists an abnormal exaltation of their vital energies, or that peculiar condition of their nervous and vascular systems, now usually designated irritation. With this term we have generally been accustomed to associate the idea of pain as its necessary concomitant; but we must not forget that the gastro-intestinal mucous tissue does not stand in the same intimate relation with the centre of perception, as most of the other parts of the system. Through the intervention of the ganglionic system, from which this tissue is almost solely supplied with nervous energy, impressions made upon it are not transmitted to the seat of consciousness; hence a very high degree of excitement may exist in its actions without the manifestation of pain. The stomach, from its immediate connexion with the brain, by the gastric branch of the eighth pair of nerves, gives intimations of suffering much more readily than the other parts of the canal, yet we know that irritation of this organ frequently exists to a considerable degree without giving more than indistinct sensations of pain. The stomach, however, declares its sufferings by a no less unequivocal intimation, through the agency of its muscular apparatus; hence we observe the phenomena of nausea, retching and vomiting. Throughout the whole system, we find the various mucous membranes in relation with muscular structures, to whose motion they stand in the relation of indices. Thus, the muscles of the perineum are associated with the sensibility of the urinary organs; those of the mouth, pharynx, and œsophagus, with the mucous lining of these passages;

the muscles of respiration, with the mucous membrane of the air-passages, and with that of the stomach ; and the muscular coat of the whole alimentary canal, with its mucous coat. The appropriate incitements to action, in these various muscular apparatus, are propagated from their respective mucous membranes : purgatives incite the muscular coat of the intestines to motion, solely by the stimulation transmitted to it from the mucous coat ; accelerated peristaltic motion is necessarily preceded by increased nervous energy and vascular action of the mucous surface ; and a torpid condition of this surface is as necessarily connected with a sluggish state of the muscular coat. These considerations naturally lead us to infer, that the extraordinary activity of the muscular coat of the intestines, in Cholera, is connected with a very high degree of excitement in its associated mucous membrane, and the increased quantity of matter, excreted from this membrane, is a direct proof of an inordinate determination of the circulating fluids to this tissue. An inordinate determination of the fluids to any organ is a proof of excitement in that organ, we have then the strongest proofs, short of ocular demonstrations, that the mucous membrane of the intestines, in Cholera, is in a highly excited state : but the extreme thirst ; the almost indomitable irritability of the stomach ; the distress produced by the application of heat ; the relief afforded by ice, and even by ice-cold water, when not taken so as to irritate the stomach by its bulk ; the good effects produced by sinapisms, cups, or leeches over the epigastric region, and many other well established facts, all prove incontestably, that the morbid action of the internal organs is one of high excitement.

Too little attention is in general paid to the sympathetic range of the digestive organs, and hence many of the phenomena of disease connected with those organs are very imperfectly understood. When we consider the complicate nature of the structures of this important apparatus, and the part which it performs in the animal economy, we cannot be surprised, that its diseased condition implicates all the other functions in the body,

The abundance of blood vessels which it receives, and the quantity of nervous matter distributed upon it, are sufficient to impress us with a strong conviction of the constitutional derangements, that must result from its extensive irritation. The total of the surface of the alimentary canal exceeds that of the skin; and when we reflect, that the muciparous glands, distributed upon it, exceed 40,000 in number, we are led to infer, that in an affection such as Cholera, in which the whole excretory apparatus seems to be engaged in the rapid effusion of fluids, the derangement and prostration resulting throughout the system, must be amazing. In ordinary cases of irritation, when only a small portion of the canal is affected, we have often to observe the production of most alarming phenomena. Every day we see tremendous convulsions produced in children, by worms. From the same cause result palpitations, syncope, tetanus, and a whole host of other affections. Crude, indigestible substances, that do not correspond with the assimilating powers of this organ, are observed to produce the most astonishing effects—as violent cramps, spasms, and in some instances, even rupture of the stomach, congestion, collapse, coma and death. The excited action of the mucous membrane, in Cholera, cannot be expected to be succeeded by the ordinary consequences of irritation in other organs of a different structure, and of less extent. The tendency to phlogosis, or a completion of the process called inflammation, is in Cholera altogether suppressed, by two of the strongest agencies in the reduction of overaction, to wit, vascular depletion, and consequent nervous prostration. The degree of excitement seems to be just sufficient to keep up an inordinate flow upon the parts, but not to effect the elimination of the more vitalised fluids, which form the deposits effused by inflammatory action. Besides, in the alimentary mucous tissue, the sanguineous fluids have two very different channels through which, when flowing in increased quantities, they may take their course. One of these is that by the proper nutritive vessels of the tissue, and the other is that by the excreting or secerning mucous

serous follicles on the surface of the canal. According as the fluids are determined into one or other of these channels, we shall have resulting the phenomena of phlogosis, or an effusion analogous to that observed in the diarrhœa of Cholera, and of other affections in which the nutritive action undergoes no increase in its energy. It is very probable, that, were the extent of surface, affected in Asiatic Cholera, limited to a portion of the canal, instead of reaching from one extremity to the other, we should see a very different series of phenomena resulting. The fluids, instead of being diffused over a surface of fifteen square feet, would be determined to one particular locality; the energy of the nervous apparatus would be concentrated on this part, and there would be observable as great a difference in the effects resulting, as there is between the unmodified force of the sun's rays, and that which they acquire when concentrated by a convex lens.

The morbid phenomena observed in the latter stages of Cholera, are referable to the effects produced by the action of the primary cause, in conjunction with those which have resulted from these effects. The complete draining of the system by the colliquative serous effusion, from the vessels opening on the intestinal surface, not only deprives every part of the system of the nutritive fluids, by which the energies of all the organs are kept up, but it also produces a vitiated condition of the remaining portion, rendering it completely unfit for the purposes which it is intended to effect. The viscid black blood in the organs acts upon them as a deleterious substance, and must soon cause a complete destruction of their vitality. Hence we see every organ in the body completely paralyzed, and death is the speedy and inevitable result.

In cases, in which the action of the primary cause is very intense, the ordinary series of phenomena is not observed to take place. So much is effected by the first agent, that little is left to be done in order to effect the complete extinction of all vitality in the system; hence, cases are met with, in which the patient is at once prostrated and life extinguished almost as rapid-

ly as if he had been struck by lightning; in other instances one or two faint efforts at vomiting are made, the patient has a copious alvine dejection, collapse instantly succeeds, and death results in a very few hours. Here the intervention of the exhausting serous diarrhoea is not required to destroy life; and the complete destruction of the vital energies prevents the occurrence of that exalted action in the intestinal mucous membrane which is its efficient cause. For the same reason, in very violent cases, we observe that cramps are either altogether absent, or terminate very speedily; the same remark has been made with regard to vomiting. Both these symptoms indicate an undue degree of stimulation in the muscular fibre; but this undue stimulation, resulting from exalted nervous energy, must cease to be produced as soon as this energy becomes extinct. Towards the termination of the fourth stage, or that of fully formed collapse, we generally find the patient, unless of a very robust habit of body, fall into a state of complete quiescence, vomiting and cramps are gone; the fluid discharge runs unintermittingly from him, and he is totally unconscious of the passage of it per anum.

TREATMENT.

Nothing can more fully illustrate the vague and inconsistent opinions of medical men, relative to the pathology of Cholera, than the endless variety of remedies that have been recommended in its treatment. Indeed a very cursory examination of the various modes of treatment which have been trumpeted forth, as triumphantly successful in this disease, will suffice to convince us that the great majority of practitioners have been guided by no clear or decided views of its real nature. Were we, for instance, to ask with what intention tartrate of antimony has been injected into the veins, would not the practitioner be rather puzzled, in

shaping any kind of a plausible reply? This remark applies with equal force to hundreds of other remedies which have been had recourse to.

The treatment of Cholera must be determined, almost exclusively, by the period of the disease at which the practitioner happens to be called in. Should the patient be so fortunate as to have recourse to medical advice, during the premonitory stage, there is little doubt of the physician being able, by a judicious employment of appropriate remedies, and a strict system of regimen, seconded by the prudence and attention of the patient, to control the threatening malady. As the disease, in nineteen cases out of twenty, commences by a diarrhoea, varying in duration from a few hours to several days, or even, in some cases, to one or two weeks, it must be our principal object to become well acquainted with the remedies by which this affection is most certainly and safely controlled; and a preference should always be given to such as we may find, generally, most efficacious, and with whose mode of action we are, consequently, best acquainted.

In many cases of incipient choleric diarrhoea, all that is requisite, is merely to enforce the observance of absolute quiescence. Every organ in the system should be allowed a perfect state of rest. For this purpose the patient should be ordered to bed; the room should be kept agreeably cool, and freely ventilated by throwing open the windows, if the weather be hot, or by keeping open those of the adjoining apartments if it should be cool or windy.

Very limited quantities of mild diluents, at a cool temperature, as sago-water, rice-water, flour-gruel may be given. But unless strict reliance can be placed in the prudence of the patient and his attendants, it will be safer to prescribe complete abstinence from every article both of food and drink. This may appear to be unnecessary severity; but there are few practitioners that have had extensive experience in the treatment of Cholera, who cannot bear witness to its general propriety. There is always amongst the community a belief, that the directions of medical men

are graduated from a calculation, that their limits may be transgressed without risk, and we cannot in all cases, predict to what extent this transgression may reach; now, the state of the stomach, in this stage, is often such, that the slightest impression upon it will give full developement to the symptoms of the second, whereas, if it were allowed to be at perfect rest, nature would be quite able to re-establish the equilibrium of the functions, without any assistance from medicine. If possible, we ought always to place the patient under the immediate controul of a *mole* attendant, who should watch every movement both of the nurse and of the relatives. If the person whom we select be *not* a relative, it will be so much the better, and he should always be a man of good sense and firm nerve. In the management of Cholera, at this period, and still more particularly in the subsequent one, we cannot be too punctilious; our commands should be absolute, decisive and clear—we should never suffer the slightest deviation from them; for the life of our patient may be the forfeit of the most trifling remission which we concede. Women are not to be trusted with the management of the patient, unless we cannot procure a good male attendant. This is a rule that should be more attended to, than may by many be supposed—they have not sufficient firmness, or rather they are possessed of too much tenderness to resist the almost irresistible entreaties which the patient often makes, for something to satiate his unquenchable thirst—so far as courage is concerned; to encounter the greatest personal danger, and affection, to undergo the most trying privations, our confidence in them may be unlimited—they never desert their post. Men are cowards by the bedside of pestilence, but women seem there to acquire energies beyond the powers of our conception. Perhaps one of the greatest difficulties which the practitioner has to encounter, is that of convincing the patient of the extent of his danger—if we represent his case to him in an exaggerated form, we may excite a degree of alarm that will prove highly prejudicial; if we attempt to describe his situation in its real nature, we will gener-

ally fail in making ourselves sufficiently understood; and if we depreciate the peril in which he stands, he may disregard all precaution. In many cases we find a degree of apathy existing, which cannot be regarded in any other light than that of absolute fatuity. Patients are met with, in whom a diarrhoea has run on for many days, and yet they have never bestowed a thought upon it, until they have been startled by the accession of cramps, vomiting, and watery limpid stools; when we interrogate them, they confess that they "have had a lax" for several days; but they "thought nothing about it, for there was no pain;" they have been unusually thirsty, and have indulged freely in the use of fluids—indeed we generally find that the violent symptoms first appear after an unusually copious draught, to allay the thirst, which alone attracts their attention.

*"Nec sentit fatique genus, mortemque veneni;
Sed pūstat esse sitim."*

It will often be found, that if the patient be merely enjoined to remain tranquil, and to abstain from every kind of ingesta, without our prescribing, at the same time, something in the shape of medicine, he will take just as much of our advice as he judges necessary—he does not suppose that anything can be wrong when the doctor orders no medicine, and he consequently sees no danger that can arise from indulging his inclinations—he indulges—and too often his life is the price of his own temerity. It will therefore always be the part of prudence to order some medical remedies; and our directions for their use should be given in such a way as will give an idea of importance to their regular administration. It is true this wears the appearance of imposture; but no man will ever chide us for cheating him into his life, when death may have been within a few hours of him. If the derangement of the bowels be very slight, a grain or two of the blue mass, with the same quantity of rhubarb, will, in general, be all that is necessary; this may be repeated every three or four hours, until the symptoms subside, or regular healthy stools be produced. Should the bowels have been ra-

ther free, and bilious derangement be indicated by the colour of the stools, or their offensive smell, a small dose of calomel, followed, after a few hours, by a gentle dose of rhubarb, will sufficiently act on the secretory organs, and procure a safe evacuation of the bowels; saline purgatives and drastica are not to be ventured on. It is true, the employment of saline aperients would, in many cases, seem to be most applicable; but irreparable mischief has sometimes been caused by their administration; and it will, consequently, be most prudent to omit their use, as we can manage the case quite well without them.

Stimulating substances, which merely exalt the action of the digestive organs, without exerting any alterative permanent effect on them, will generally prove injurious. It is true, a glass of brandy, gin or rum, will sometimes be sufficient to arrest the progress of the disease; but the injury that is done by the indiscriminate use of these fluids, exceeds all calculation; the safest practical rule is, therefore, to prohibit them altogether. If they fail in effecting the desired purpose, they must do harm, and for one instance in which they have done good, they have in a hundred aggravated the existing derangement; and from an unfounded confidence in their utility, the patient has squandered away those invaluable hours, during which his case, if properly attended to, would have been quite tractable.

When the bowels have become unusually loose, the sooner they are attended to the better; and though, in many cases, we might pursue a different course, yet the arresting of the diarrhoea can never do harm, if proper attention be subsequently paid to the condition of the bowels. A few doses of blue mass and chalk, at intervals varying from two to four hours, will be adequate to effect our object; other astringents might be employed, but none of them seems to exert so kindly, and salutary a change, as those just mentioned. Should gastric irritability be present, we may add a quarter or half a grain of opium to each dose; taking care to discontinue this substance as soon as we have ascertained that the others will be retained without it; in some instances it

will be necessary for us to anticipate the diarrhoea, as, though it may not yet have commenced, still from the presence of other unequivocal symptoms, we may have reason to expect it in a shorter or longer time. Dr. Stephenson had some cases last year, in which the first symptom was a suppression of urine; on close examination, he discovered the existence of other derangements, which put his diagnosis beyond question; and by a timely recourse to proper remedies, he succeeded in preventing the further progress of the disease.

When vomiting has already commenced, the sooner we arrest it the better, for the prostrating effects of this operation are too well known to require anything to be said on its baneful tendency at this critical period. In general, a drachm of ether, with thirty drops of laudanum, will arrest this action at the commencement; if this do not succeed, a repetition of the dose will do more harm than good. A large sinapism of flour of mustard, applied warm, should immediately be put over the region of the stomach; we need not fear making it too large. Sinapisms may likewise be applied to the soles of the feet, and the calves of the legs. These applications act on the principle of counter stimulation and derivation. If watery, flocculent stools be present, our internal remedies must be persisted in with patience. We may employ some of the stronger astringents, as kino, galls, catechu, alternating them with the blue mass and chalk. The combination of calomel with these astringents is of much service, but the dose should not be large, for it is found that if given in small quantities, repeated every hour or two, it succeeds better. Calomel in large doses acts too powerfully on the organs, and produces a stimulation too great for their present deteriorated condition. We should not hope that the increase of quantity in this medicine will be a substitute for the want of action in the mucous membrane, when its vitality has been already overpowered; if it acts at all it will act best in small doses, and if the membrane be becoming insusceptible of stimulation, too large a dose will only extinguish the little of life that is remaining. In this state of declining vitality the tissues are in a condition



very analogous to that in which they are placed by long continued cold or hunger, and we know that in this case a very moderate degree of stimulation is all that can be safely had recourse to; and if we stimulate too freely we hasten the complete death of the party. It is from this circumstance that the application of general warmth is so intolerable to the patients, and so baneful in its results. Some patients in Cholera have been actually roasted to death. A most valuable accession to the treatment of Cholera, and one that is fortunately most grateful to the patient, and very easily procured in this country, is ice. The safest mode of administering it, is by giving it in pieces about the size of an almond, and instructing the patient to allow it to dissolve in the mouth, and swallow it as it melts. The effect it produces is astonishing, and tends strongly to corroborate the views that have here been taken of the pathology of Cholera.

A great deal more might be said on this subject, but this Essay has already been extended beyond its prescribed limits; besides the author is not vain enough to suppose that so important a subject would be much benefited by anything which he might be able to suggest. It was intended to have entered into the consideration of the febrile stage, or that of reaction resulting after Cholera, but enough has perhaps already been written to have exercised sufficiently the patience of the reader.